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Installation Guide

TBX-1325 High-Voltage Terminal Block

This guide describes how to install and use the TBX-1325 high-voltage terminal block with the SCXI-1124 module.

Introduction

The TBX-1325 high-voltage terminal block is a DIN rail-mountable terminal block with 30 screw terminals for easy connection to the SCXI-1124 front connector. Six of the screw terminals connect to the SCXI chassis ground via the SH48-48-A cable. The remaining 24 screw terminals are for signal connection to the six module output channels. The TBX-1325 mounts on most European standard DIN EN mounting rails.

What You Need to Get Started

- ❑ TBX-1325 high-voltage terminal block kit
  - TBX-1325 high-voltage terminal block
  - *TBX-1325 High-Voltage Terminal Block Installation Guide*
  - $^{1}/_{8}$ in. flathead screwdriver
- ❑ SCXI chassis
- ❑ SCXI-1124 module and documentation
- ❑ SH48-48-A cable assembly
- ❑ Long-nose pliers
- ❑ $^{3}/_{16}$ in. wrench
- ❑ No. 1 Phillips-head screwdriver

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Installation

Perform the following steps to mount the SH48-48-A cable assembly and connect the TBX-1325 to your SCXI-1124 module. Refer to Figures 1 and 2 as needed.

Warning: ***SHOCK HAZARD: Refer to the*** *Signal Connection* ***section BEFORE connecting signals. If signal wires are connected to the terminal block, dangerous voltages may exist even when the equipment is turned off.***

1. Turn off your SCXI chassis.

2. Turn off the computer that contains your data acquisition device or disconnect the device from your SCXI chassis.

3. Slide the SCXI module out of the SCXI chassis.

4. Unscrew the SCXI module grounding screw with a No. 1 Phillips-head screwdriver and remove the module cover (see Figure 1).

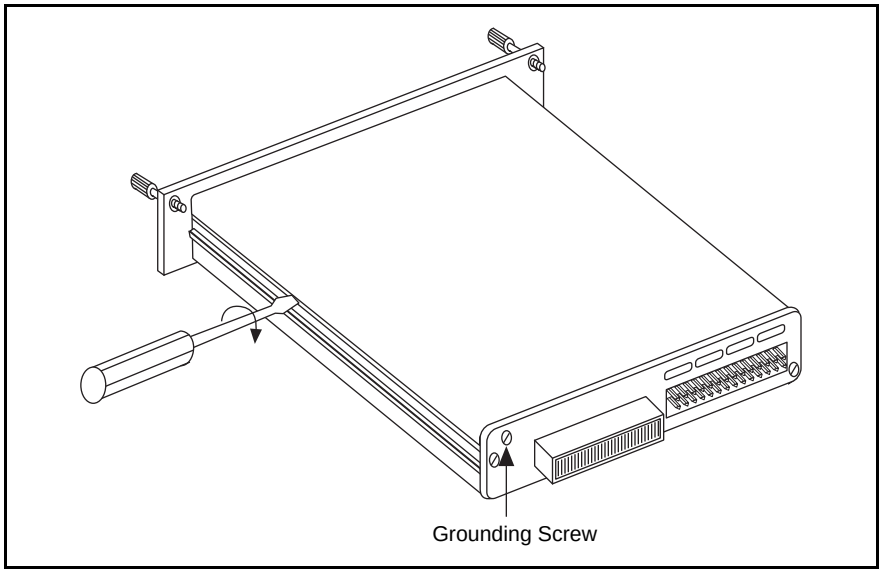


Figure 1. Removing the SCXI Module Cover

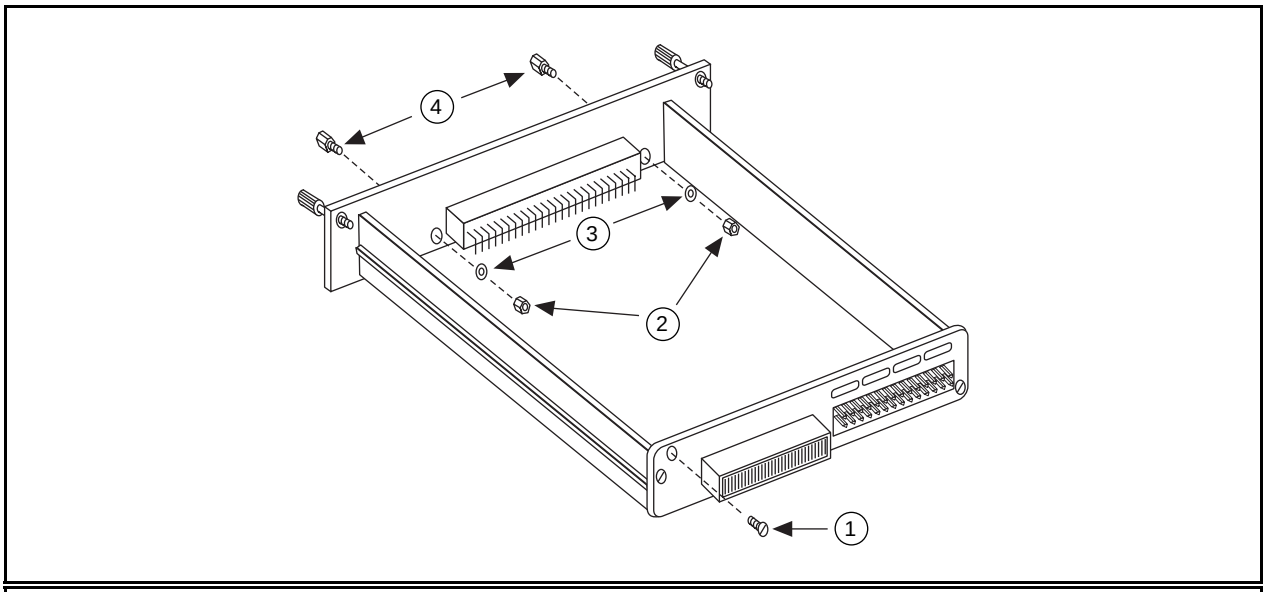
5. Place one jack screw as shown in Figure 2.

6. While holding the jack screw in place, insert the lockwasher and then the nut. Use long-nose pliers to do this.

7. Tighten the nut by holding it firmly and rotating the jack screw with a $^{3}/_{16}$ in. wrench.

8. Repeat steps 5 through 7 for the second jack screw.

9. Replace the SCXI module cover and tighten the grounding screw.



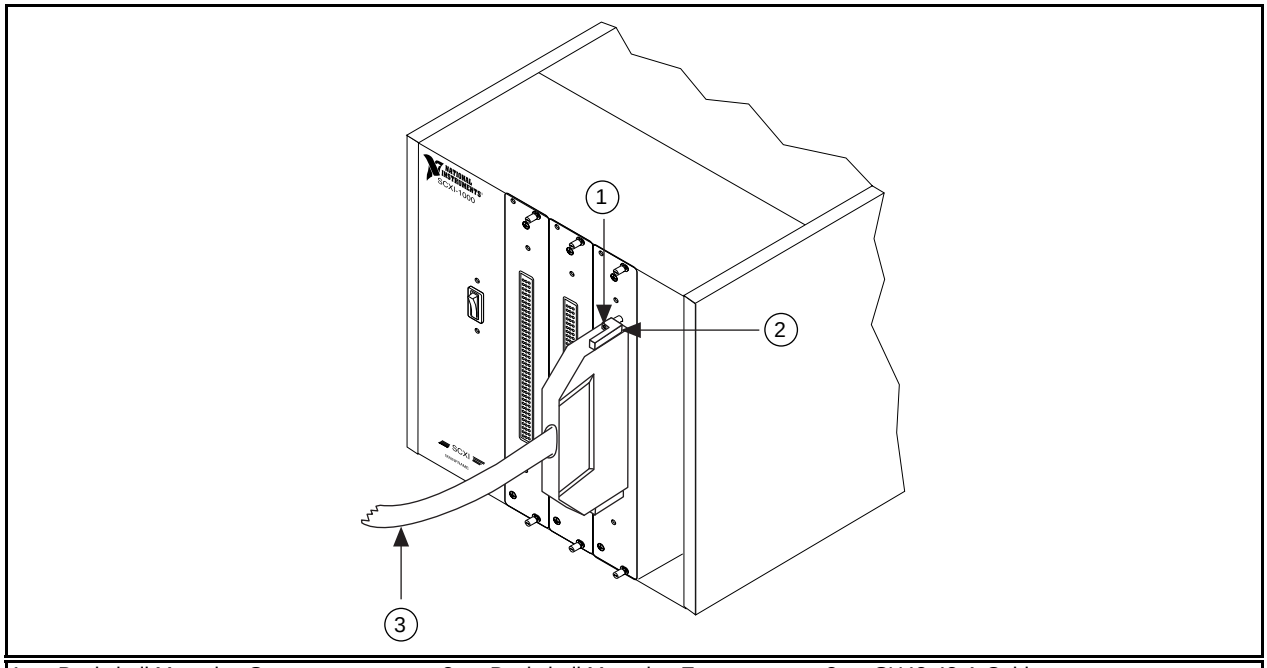
1	Grounding Screw	3	Lock Washers
2	Nuts	4	Jack Screws

Figure 2. Preparing the SCXI Module for the Cable Assembly

10. Slide the SCXI module back into place in the SCXI chassis.

11. Verify that the backshell mounting ears are in the position shown in Figure 3. If not, remove the backshell mounting ears and install them in the position shown.

12. Connect one end of the cable assembly to your SCXI module front connector and secure the SH48-48-A cable by tightening both backshell mounting screws.

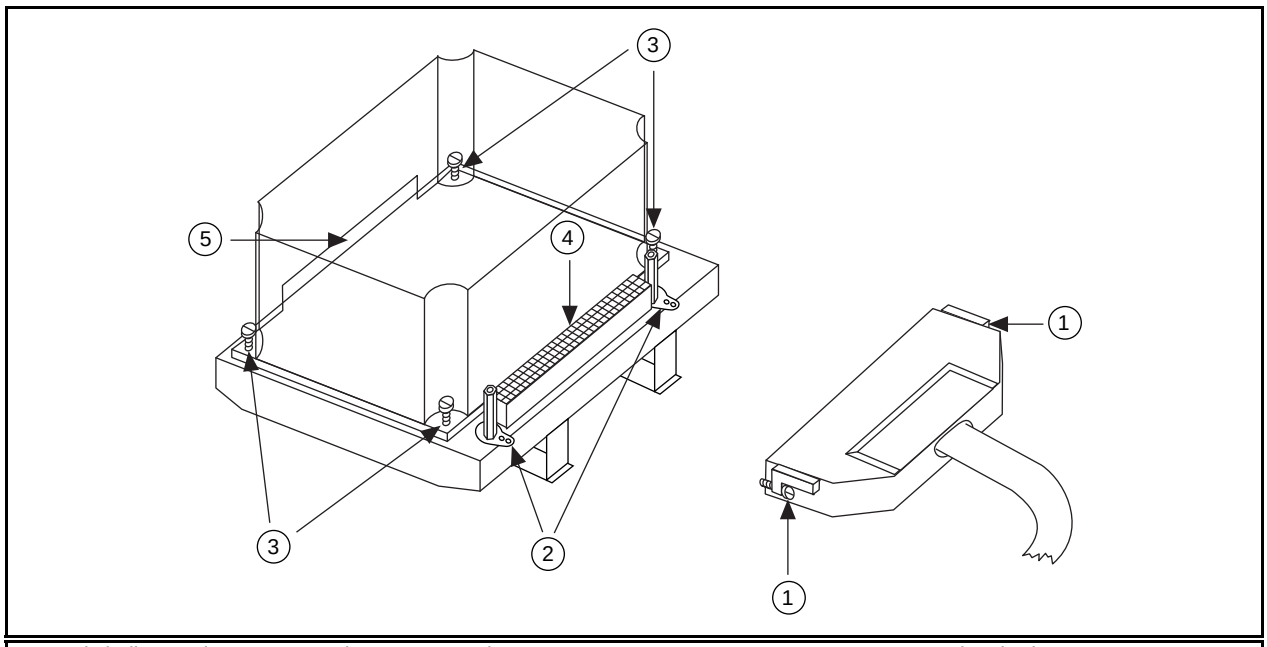


1	Backshell Mounting Screw	2	Backshell Mounting Ear	3	SH48-48-A Cable

Figure 3. Connecting the SH48-48-A Cable to the SCXI Module

13. Connect the other end of the cable assembly to your TBX-1325 terminal block connector and secure the SH48-48-A cable by tightening both backshell mounting screws. See Figure 4.

See Figure 5 for the completed installation.



1	Backshell Mounting Screws and Ears	3	Captive Cover Screws	5	Signal Wire Entry
2	Shield Grounding Solder Lugs	4	Terminal Block Connector		

Note: ***The SH48-48-A cable is not shown in the exact position for proper connection to the terminal block connector. See Figure 5 for the completed connection.***

Figure 4. Connecting the SH48-48-A Cable to the TBX-1325 Terminal Block

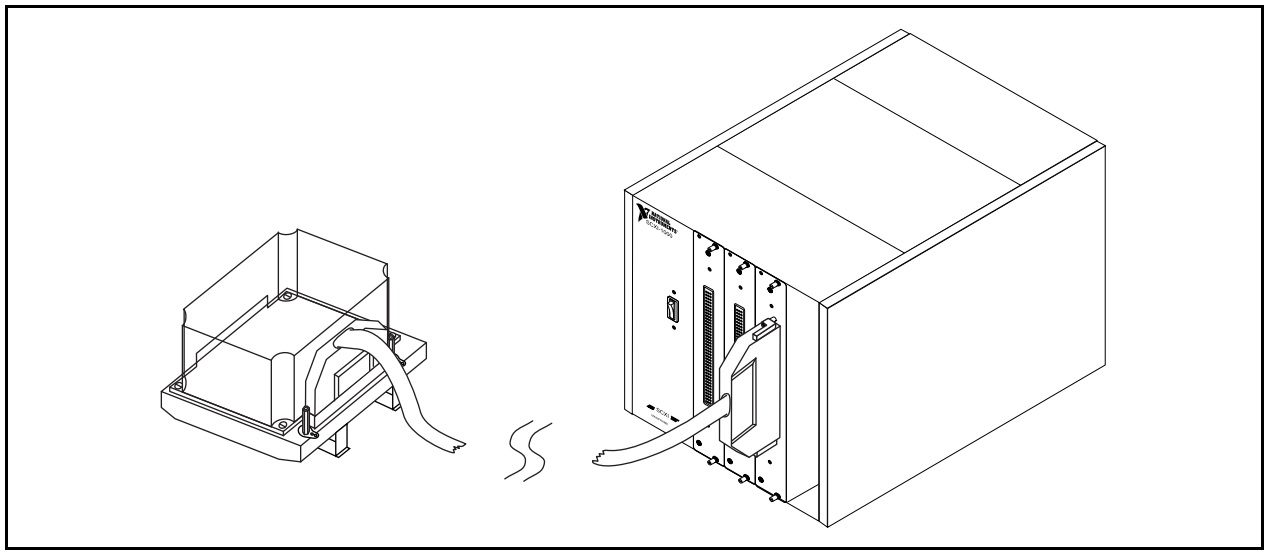


Figure 5. The Completed Installation

Rack Mounting

Once you have completed the above installation instructions, you are ready to mount the TBX assembly in your rack. If you are using the National Instruments TBX Rack-Mount Assembly, refer to the *TBX Rack-Mount Installation Guide* for instructions. If you are not using this rack-mount assembly, perform the following steps to mount the TBX assembly directly onto your DIN rail.

1. Snap the TBX terminal block onto the DIN rail with a firm push.

   To remove the TBX terminal block from the DIN rail, place a flathead screwdriver into the slot above the terminal block base and pry it from the rail.

2. Install the SCXI chassis using the appropriate chassis rack-mount kit.

Signal Connection

The following warnings contain important safety information concerning the use of hazardous voltage levels with TBX-1325 terminal blocks.

Warnings: ***SHOCK HAZARD: Only qualified personnel aware of the dangers involved should use the TBX-1325. If signal wires are connected to the terminal block, dangerous voltage levels may exist even when the equipment is turned off. Before you remove or work with any installed terminal block, disconnect the AC power line or any high-voltage sources (>30 Vrms and 42.4 V peak, or 60 VDC) that may be connected to the terminal block. National Instruments is NOT liable for any damages or injuries due to misuse of high-voltage signals connected to the terminal block.***

When using the terminal block with high voltage levels, you must insulate all signal wires appropriately to the highest voltage the terminal block may come in contact with. National Instruments is NOT liable for any damages or injuries resulting from inadequate signal wire insulation.

Any CHASSIS GROUND terminal on your terminal block is for grounding high-impedance sources such as a floating source (1 mA maximum). Do not use these terminals as safety earth grounds.

Operating common-mode voltage must not exceed 250 Vrms between banks or from any bank to earth.

When connecting your field signals to the TBX-1325 high-voltage terminal block for use with the SCXI-1124, follow the labeling on the TBX-1325 that matches the signal names from the *SCXI-1124 User Manual.* For information regarding the function and use of the SCXI-1124 signals, consult your *SCXI-1124 User Manual.*

Read the next section, *Voltage Drops*, before proceeding with the signal connections.

Voltage Drops

The voltage output of the SCXI-1124 can drive up to 5 mA. When you use the SCXI-1124 in voltage mode with the TBX-1325, a small amount of voltage drop will develop across the positive/negative channel wires in the SH48-48-A cable and across any other wires you may have connected to this channel. This voltage drop is due to the wire resistance and the current flow in these leads. Voltage drop is not a concern if you are using the SCXI-1124 in the current mode.

To reduce errors in your output voltage, first you need to calculate the voltage drop across the SH48-48-A cable. This voltage drop results in an error in your measurement and depends on the cable length and on the load impedance and configuration. Solutions to this problem include:

- Locate the load closer to the SCXI-1124 by using shorter cable lengths.
- Use heavy-gauge wire to connect to the TBX-1325.
- Add a high-impedance input buffer near the load.
- Calibrate your system to account for the resistive losses of the cable.

The SH48-48-A cable has a resistance of 0.21 Ω/m. To determine the amount of error introduced by the cable, do the following:

1. Calculate the total resistance (R_{TL}) of the cable based on the cable length.
2. Determine the amount of current (I_L) being drawn from the SCXI-1124.
3. Use the following formula to determine the total voltage drop (V_{drop}) in the positive/negative channel leads:

$$V_{drop} = R_{TL} \times I_L$$

For example, if you have a 1 m SH48-48-A cable and a 5 mA load, then your calculations from steps 1 through 3 would be:

1. R_{TL} = 2 x 0.21 Ω/m x 1 m = 0.42 Ω; notice that you multiply the cable length by 2 to take into consideration both the positive and negative channel lead resistances.
2. I_L = 5 mA, which is the total current draw from the SCXI-1124.
3. V_{drop} = 2.1 mV ⇔ 0.042% of full scale at 0 to 5 V range.

You then need to calculate the voltage drop across the field signal wires you are connecting to the TBX-1325. For example, 30 m of 22 AWG stranded copper wire has about 1.5 Ω of resistance. Thus, driving a load 15 m away at 5 mA will produce an error at the load of 7.5 mV. Add this error amount to the voltage drop across the SH48-48-A cable to get a total voltage drop of 9.6 mV.

Wiring Instructions

To connect your field signals to the TBX-1325 terminal block, refer to Figures 4 and 6 as you perform the following instructions:

1. Remove the TBX-1325 terminal block cover by unscrewing the four captive cover screws in the cover corners. These screws stay attached to the cover without falling out.

2. Connect the signal wires to the screw terminals. Refer to your SCXI module user manual for examples of how to connect to field signals and loads.

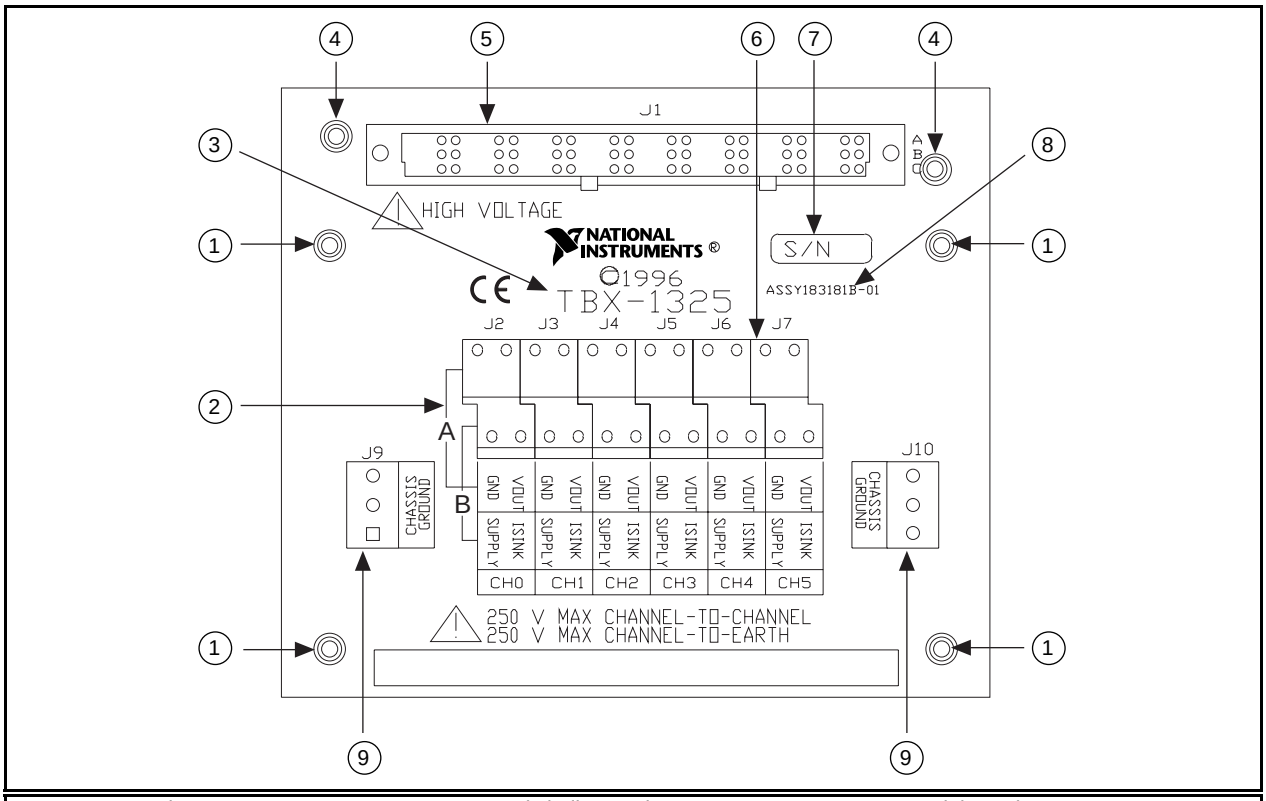
Note: ***The board has corresponding rows labeled A and B to help you make the correct connections, as shown in Figure 6, item 2.***

   Note that the CHASSIS GROUND terminals are connected to the SCXI chassis via the cable shield. This is not shown in your SCXI module user manual. Allow your signal wires to exit through the terminal block cover opening.

Note: ***This terminal block does not provide strain relief for field signal wires. Add strain relief, insulation, and padding for your field signal wires, if necessary.***

3. Replace the TBX-1325 terminal block cover and tighten the captive cover screws.

The installation and signal connection are now complete. Figure 6 shows the TBX-1325 parts locator diagram.



1	Cover Mounting Nuts	4	Backshell Mounting Nut	7	Serial Number
2	Corresponding Rows	5	Cable Mating Connector	8	Assembly Number
3	Product Name	6	Signal Wire Screw Terminals	9	Chassis Ground Screw Terminal

Figure 6. TBX-1325 Parts Locator Diagram

Specifications

Common-mode isolation.....250 Vrms between channels, and channel to earth ground

Compatible DIN rails.....DIN EN 50 022
DIN EN 50 035

Terminal block dimensions.....12.7 x 7.62 x 11.18 cm (5 x 3 x 4.4 in.)